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Relevance scale 

1 Fast detection of communication patterns in distributed executions 

Thomas Kunz, Michiel F. H. Seuren

November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**

Full text available:  [pdf\(4.21 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

2 The true lift model: a novel data mining approach to response modeling in database marketing 

Victor S. Y. Lo

December 2002 **ACM SIGKDD Explorations Newsletter**, Volume 4 Issue 2

Full text available:  [pdf\(119.81 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

In database marketing, data mining has been used extensively to find the optimal customer targets so as to maximize return on investment. In particular, using marketing campaign data, models are typically developed to identify characteristics of customers who are most likely to respond. While these models are helpful in identifying the likely responders, they may be targeting customers who have decided to take the desirable action or not regardless of whether they receive the campaign contact (e ...

Keywords: customer development, customer relationship management, data mining, database marketing, interaction effect, knowledge discovery, predictive modeling, response modeling, treatment effect, true lift, upselling and cross-selling

3 Extracting predicates from mining models for efficient query evaluation 

Surajit Chaudhuri, Vivek Narasayya, Sunita Sarawagi

September 2004 **ACM Transactions on Database Systems (TODS)**, Volume 29 Issue 3

Full text available:  [pdf\(698.37 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Modern relational database systems are beginning to support ad hoc queries on mining

models. In this article, we explore novel techniques for optimizing queries that contain predicates on the results of application of mining models to relational data. For such queries, we use the internal structure of the mining model to automatically derive traditional database predicates. We present algorithms for deriving such predicates for a large class of popular discrete mining models: decision trees, naï ...

Keywords: Complex predicate optimization, simpler rules from complex predictive functions

4 Towards on-line analytical mining in large databases

Jiawei Han

March 1998 **ACM SIGMOD Record**, Volume 27 Issue 1

Full text available:  [pdf\(387.04 KB\)](#) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Great efforts have been paid in the Intelligent Database Systems Research Lab for the research and development of efficient data mining methods and construction of on-line analytical data mining systems. Our work has been focused on the integration of data mining and OLAP technologies and the development of scalable, integrated, and multiple data mining functions. A data mining system, DBMiner, has been developed for interactive mining of multiple-level knowledge in large relational databases and ...

5 Range and k NN query processing for moving objects in grid model

Hae Don Chon, Divyakant Agrawal, Amr El Abbadi

August 2003 **Mobile Networks and Applications**, Volume 8 Issue 4

Full text available:  [pdf\(210.77 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

With the growing popularity of mobile computing devices and wireless communications, managing dynamically changing information about moving objects is becoming feasible. In this paper, we implement a system that manages such information and propose two query algorithms: a range query algorithm and a k nearest neighbor algorithm. The range query algorithm is combined with an efficient filtering technique which determines if a polyline corresponding to the trajectory of a moving object inte ...

Keywords: k nearest neighbors query, moving objects, range query

6 Reports from KDD-2001: KDD Cup 2001 report

Jie Cheng, Christos Hatzis, Hisashi Hayashi, Mark-A. Krogel, Shinichi Morishita, David Page, Jun Sese

January 2002 **ACM SIGKDD Explorations Newsletter**, Volume 3 Issue 2

Full text available:  [pdf\(1.96 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

This paper presents results and lessons from KDD Cup 2001. KDD Cup 2001 focused on mining biological databases. It involved three cutting-edge tasks related to drug design and genomics.

Keywords: Competition, biology, drug design, genomics

7 Models and languages for parallel computation

David B. Skillicorn, Domenico Talia

June 1998 **ACM Computing Surveys (CSUR)**, Volume 30 Issue 2

Full text available:  [pdf\(298.05 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We survey parallel programming models and languages using six criteria to assess their suitability for realistic portable parallel programming. We argue that an ideal model should be easy to program, should have a software development methodology, should be architecture-independent, should be easy to understand, should guarantee performance, and should provide accurate information about the cost of programs. These criteria reflect our belief that developments in parallelism must be driven by ...

Keywords: general-purpose parallel computation, logic programming languages, object-oriented languages, parallel programming languages, parallel programming models, software development methods, taxonomy

8 Articles on microarray data mining: Statistical methods for joint data mining of gene expression and DNA sequence database 

Marla D. Curran, Hong Liu, Fan Long, Nanxiang Ge

December 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 2

Full text available:  [pdf\(869.45 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

One of the purposes of microarray gene expression experiments is to identify genes regulated under specific cellular conditions. With the availability of putative transcription factor binding motifs, it is now possible to relate gene expression pattern to the pattern of transcription factor binding sites (TFBS), as well as study how TFBS interact with each other to control gene expression. The objectives of this study are to develop a systematic approach for combining data from microarray gene e ...

Keywords: T-helper cells, cluster analysis, logistic regression, microarray, modeling, regulatory motifs, transcription factor binding site (TFBS)

9 Research sessions: data mining applications: Cost-based labeling of groups of mass spectra 

Lei Chen, Zheng Huang, Raghu Ramakrishnan

June 2004 **Proceedings of the 2004 ACM SIGMOD international conference on Management of data**

Full text available:  [pdf\(351.21 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

We make two main contributions in this paper. First, we motivate and introduce a novel class of data mining problems that arise in labeling a group of mass spectra, specifically for analysis of atmospheric aerosols, but with natural applications to market-basket datasets. This builds upon other recent work in which we introduced the problem of labeling a single spectrum, and is motivated by the advent of a new generation of Aerosol Time-of-Flight Spectrometers, which are capable of generating ma ...

10 Industry/government track papers: Predicting prostate cancer recurrence via maximizing the concordance index 

Lian Yan, David Verbel, Olivier Saidi

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(172.87 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In order to effectively use machine learning algorithms, e.g., neural networks, for the analysis of survival data, the correct treatment of censored data is crucial. The concordance index (CI) is a typical metric for quantifying the predictive ability of a survival model. We propose a new algorithm that directly uses the CI as the objective function to train a model, which predicts whether an event will eventually occur or not. Directly optimizing the CI allows the model to make complete use of ...

Keywords: concordance index, neural networks, nomogram, prostate cancer recurrence, survival analysis

11 Multi Relational Data Mining (MRDM): Biological applications of multi-relational data mining 

David Page, Mark Craven

July 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 1

Full text available:  [pdf\(1.12 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Biological databases contain a wide variety of data types, often with rich relational structure. Consequently multi-relational data mining techniques frequently are applied to biological data. This paper presents several applications of multi-relational data mining to biological data, taking care to cover a broad range of multi-relational data mining techniques.

12 Industry/government track posters: Mining traffic data from probe-car system for travel time prediction 

Takayuki Nakata, Jun-ichi Takeuchi

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(297.21 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We are developing a technique to predict travel time of a vehicle for an objective road section, based on real time traffic data collected through a probe-car system. In the area of Intelligent Transport System (ITS), travel time prediction is an important subject. Probe-car system is an upcoming data collection method, in which a number of vehicles are used as moving sensors to detect actual traffic situation. It can collect data concerning much larger area, compared with traditional fixed dete ...

Keywords: ITS, information criterion, probe-car, time series, travel time

13 Searching in high-dimensional spaces: Index structures for improving the performance of multimedia databases 

Christian Böhm, Stefan Berchtold, Daniel A. Keim

September 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 3

Full text available:  [pdf\(1.39 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

During the last decade, multimedia databases have become increasingly important in many application areas such as medicine, CAD, geography, and molecular biology. An important research issue in the field of multimedia databases is the content-based retrieval of similar multimedia objects such as images, text, and videos. However, in contrast to searching data in a relational database, a content-based retrieval requires the search of similar objects as a basic functionality of the database system ...

Keywords: Index structures, indexing high-dimensional data, multimedia databases, similarity search

14 Articles on microarray data mining: Differential expression, class discovery and class prediction using S-PLUS and S+ArrayAnalyzer 

Michael O'Connell

December 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 2

Full text available:  pdf(958.46 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

Microarrays are a powerful experimental platform, allowing simultaneous studies of gene expression for thousands of genes under different experimental conditions. However there is much biological variability induced throughout the experimental process that can obscure the biological signals of interest. As such, the need for experimental design, replication and statistical rigor are now widely recognized. Statistical hypothesis testing has become the accepted differential expression analysis app ...

Keywords: S+ArrayAnalyzer, S-PLUS, class discovery, class prediction, differential expression

15 [Articles on microarray data mining: Towards interactive exploration of gene expression patterns](#) 

Daxin Jiang, Jian Pei, Aidong Zhang

December 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 2

Full text available:  pdf(527.68 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

Analyzing coherent gene expression patterns is an important task in bioinformatics research and biomedical applications. Recently, various clustering methods have been adapted or proposed to identify clusters of co-expressed genes and recognize coherent expression patterns as the centroids of the clusters. However, the interpretation of co-expressed genes and coherent patterns mainly depends on the domain knowledge, which presents several challenges for coherent pattern mining and cannot be solv ...

16 [A survey on wavelet applications in data mining](#) 

Tao Li, Qi Li, Shenghuo Zhu, Mitsunori Ogihara

December 2002 **ACM SIGKDD Explorations Newsletter**, Volume 4 Issue 2

Full text available:  pdf(330.06 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Recently there has been significant development in the use of wavelet methods in various data mining processes. However, there has been written no comprehensive survey available on the topic. The goal of this is paper to fill the void. First, the paper presents a high-level data-mining framework that reduces the overall process into smaller components. Then applications of wavelets for each component are reviewd. The paper concludes by discussing the impact of wavelets on data mining research an ...

17 [Special issue on wireless extensions to the internet: Prediction-based monitoring in sensor networks: taking lessons from MPEG](#) 

Samir Goel, Tomasz Imielinski

October 2001 **ACM SIGCOMM Computer Communication Review**, Volume 31 Issue 5

Full text available:  pdf(1.62 MB) Additional Information: [full citation](#), [abstract](#), [references](#)

In this paper we discuss the problem of monitoring data sensed in large sensor networks. A sensor typically runs on a battery having a limited lifetime. In order to increase the lifetime of a sensor it is important that the mechanisms used in monitoring them be energy-efficient. In this paper, we propose a new paradigm called Prediction-based monitoring for energy-efficient monitoring. We show that the paradigm can be visualized as a watching of a "sensor movie" and that concepts from MPEG ma ...

18 [Evolving data mining into solutions for insights: Data-driven evolution of data mining algorithms](#) 

Padhraic Smyth, Daryl Pregibon, Christos Faloutsos

August 2002 **Communications of the ACM**, Volume 45 Issue 8

Full text available: [!\[\]\(d84e7ea36f695d92cb39ec32c307ac93_img.jpg\) pdf\(106.77 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)
[!\[\]\(db9b0c6fa4ac1078c53d7f74438ad75d_img.jpg\) html\(27.95 KB\)](#)

Fundamentally, these algorithms are driven by the nature of the data being analyzed, in both scientific and commercial applications.

19 Research track: Translation-invariant mixture models for curve clustering 

Darya Chudova, Scott Gaffney, Eric Mjolsness, Padhraic Smyth
August 2003 **Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available: [!\[\]\(8d0f0e0fe25b320c33272c52aec1fbca_img.jpg\) pdf\(688.59 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper we present a family of algorithms that can simultaneously align and cluster sets of multidimensional curves defined on a discrete time grid. Our approach uses the Expectation-Maximization (EM) algorithm to recover both the mean curve shapes for each cluster, and the most likely shifts, offsets, and cluster memberships for each curve. We demonstrate how Bayesian estimation methods can improve the results for small sample sizes by enforcing smoothness in the cluster mean curves. We e ...

Keywords: EM, alignment, curve clustering, mixture model, transformation invariance

20 Biclustering Algorithms for Biological Data Analysis: A Survey 

Sara C. Madeira, Arlindo L. Oliveira
January 2004 **IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB)**, Volume 1 Issue 1

Full text available: [!\[\]\(51514032c8ca341817228f39f1307b05_img.jpg\) pdf\(1.28 MB\)](#) Additional Information: [full citation](#)

Keywords: Biclustering, simultaneous clustering, coclustering, subspace clustering, bidimensional clustering, direct clustering, block clustering, two-way clustering, two-mode clustering, two-sided clustering, microarray data analysis, biological data analysis, gene expression data.

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21 Searching in metric spaces

Edgar Chávez, Gonzalo Navarro, Ricardo Baeza-Yates, José Luis Marroquín
September 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 3

Full text available:  [pdf\(916.04 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The problem of searching the elements of a set that are close to a given query element under some similarity criterion has a vast number of applications in many branches of computer science, from pattern recognition to textual and multimedia information retrieval. We are interested in the rather general case where the similarity criterion defines a metric space, instead of the more restricted case of a vector space. Many solutions have been proposed in different areas, in many cases without cross ...

Keywords: Curse of dimensionality, nearest neighbors, similarity searching, vector spaces

22 Reports from related meetings: Interface '99: a data mining overview

Arnold Goodman
January 2000 **ACM SIGKDD Explorations Newsletter**, Volume 1 Issue 2

Full text available:  [pdf\(851.62 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

This personal overview of Interface '99 is intended to communicate its meaning and relevance to SIGKDD, as well as provide valuable information on trends within the Interface for data miners seeking to learn more about statistics. In addition, it is the newest link in a bridge between the Interface and KDD begun by References 2-4 and the sessions on KDD at Interface '98 and Interface '99.

Keywords: review of Interface'99 conference, statistics

23 Quantifiable data mining using ratio rules

Flip Korn, Alexandros Labrinidis, Yannis Kotidis, Christos Faloutsos
February 2000 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 8 Issue 3-4

Full text available:  [pdf\(451.80 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

Association Rule Mining algorithms operate on a data matrix (e.g., customers \$\times\$

products) to derive association rules [AIS93b, SA96]. We propose a new paradigm, namely, *Ratio Rules*, which are quantifiable in that we can measure the "goodness" of a set of discovered rules. We also propose the "guessing error" as a measure of the "goodness", that is, the root-mean-square error of the reconstructed values of the cells of the given matrix, when we pre ...

Keywords: Data mining, Forecasting, Guessing error, Knowledge discovery

24 Contributed articles on online, interactive, and anytime data mining: MobiMine: monitoring the stock market from a PDA 

Hillol Kargupta, Byung-Hoon Park, Sweta Pittie, Lei Liu, Deepali Kushraj, Kakali Sarkar
January 2002 **ACM SIGKDD Explorations Newsletter**, Volume 3 Issue 2

Full text available: [!\[\]\(9c4f697052545ae4fab36076e03db94f_img.jpg\) pdf\(1.16 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

This paper describes an experimental mobile data mining system that allows intelligent monitoring of time-critical financial data from a hand-held PDA. It presents the overall system architecture and the philosophy behind the design. It explores one particular aspect of the system---automated construction of personalized focus area that calls for user's attention. This module works using data mining techniques. The paper describes the data mining component of the system that employs a novel Four ...

25 SPARTAN: a model-based semantic compression system for massive data tables 

Shivnath Babu, Minos Garofalakis, Rajeev Rastogi

May 2001 **ACM SIGMOD Record, Proceedings of the 2001 ACM SIGMOD international conference on Management of data**, Volume 30 Issue 2

Full text available: [!\[\]\(ac7494f141109b59d18bf9c3aeb84d93_img.jpg\) pdf\(240.19 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

While a variety of lossy compression schemes have been developed for certain forms of digital data (e.g., images, audio, video), the area of lossy compression techniques for arbitrary data tables has been left relatively unexplored. Nevertheless, such techniques are clearly motivated by the ever-increasing data collection rates of modern enterprises and the need for effective, guaranteed-quality approximate answers to queries over massive relational data sets. In this paper, we propose SPA ...

26 Identifying prospective customers 

Paul B. Chou, Edna Grossman, Dimitrios Gunopulos, Pasumarti Kamesam

August 2000 **Proceedings of the sixth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available: [!\[\]\(e97636a3328cdaccd5ffd8fe3bc69ce6_img.jpg\) pdf\(170.89 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

Keywords: customer prospecting

27 Articles on microarray data mining: Supervised analysis when the number of candidate features (p) greatly exceeds the number of cases (n) 

Richard Simon

December 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 2

Full text available: [!\[\]\(c44c1590e4070d8cc0b28ab85cb00ddf_img.jpg\) pdf\(183.08 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

New genomic and proteomic technologies provide measurements of thousands of features for each case. This provides a context for enhanced discovery and false discovery. Most statistical and machine learning procedures were not developed for the $p > n$ setting and

the literature of DNA microarray studies contains many examples of mis-use of analytic and computational methods such a cross-validation. This paper highlights some of key aspects of p>>n problems for identifying informative fea ...

Keywords: classification, cross-validation, prediction

28 Self-spacial join selectivity estimation using fractal concepts

Alberto Belussi, Christos Faloutsos

April 1998 **ACM Transactions on Information Systems (TOIS)**, Volume 16 Issue 2

Full text available:  [pdf\(2.28 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The problem of selectivity estimation for queries of nontraditional databases is still an open issue. In this article, we examine the problem of selectivity estimation for some types of spatial queries in databases containing real data. We have shown earlier [Faloutsos and Kamel 1994] that real point sets typically have a nonuniform distribution, violating consistently the uniformity and independence assumptions. Moreover, we demonstrated that the theory of ...

Keywords: fractal dimension, range query, selectivity estimation, spatial join

29 Industrial/government track: Information awareness: a prospective technical assessment

David Jensen, Matthew Rattigan, Hannah Blau

August 2003 **Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(987.48 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Recent proposals to apply data mining systems to problems in law enforcement, national security, and fraud detection have attracted both media attention and technical critiques of their expected accuracy and impact on privacy. Unfortunately, the majority of technical critiques have been based on simplistic assumptions about data, classifiers, inference procedures, and the overall architecture of such systems. We consider these critiques in detail, and we construct a simulation model that more cl ...

Keywords: TIA, collective classification, information awareness, iterative classification, privacy, ranking classifiers, relational data mining, social network analysis, technology assessment

30 Industry/government track posters: ANN quality diagnostic models for packaging manufacturing: an industrial data mining case study

Nicolás de Abajo, Alberto B. Diez, Vanesa Lobato, Sergio R. Cuesta

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(1.14 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

World steel trade becomes more competitive every day and new high international quality standards and productivity levels can only be achieved by applying the latest computational technologies. Data driven analysis of complex processes is necessary in many industrial applications where analytical modeling is not possible. This paper presents the deployment of KDD technology in one real industrial problem: the development of new tinplate quality diagnostic models. The electrodeposition of tin on s ...

Keywords: ANNs, CRISP-DM, FMEA, tinplate quality

31 DBMiner: a system for data mining in relational databases and data warehouses

Jiawei Han, Jenny Y. Chiang, Sonny Chee, Jianping Chen, Qing Chen, Shan Cheng, Wan Gong, Micheline Kamber, Krzysztof Koperski, Gang Liu, Yijun Lu, Nebojsa Stefanovic, Lara Winstone, Betty B. Xia, Osmar R. Zaiane, Shuhua Zhang, Hua Zhu

November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**

Full text available:  pdf(280.67 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

A data mining system, DBMiner, has been developed for interactive mining of multiple-level knowledge in large relational databases and data warehouses. The system implements a wide spectrum of data mining functions, including characterization, comparison, association, classification, prediction, and clustering. By incorporating several interesting data mining techniques, including OLAP and attribute-oriented induction, statistical analysis, progressive deepening for mining multiple-level knowled...

32 A unified framework for model-based clustering

Shi Zhong, Joydeep Ghosh

December 2003 **The Journal of Machine Learning Research**, Volume 4

Full text available:  pdf(851.48 KB)

Additional Information: [full citation](#), [abstract](#), [index terms](#)

Model-based clustering techniques have been widely used and have shown promising results in many applications involving complex data. This paper presents a unified framework for probabilistic model-based clustering based on a bipartite graph view of data and models that highlights the commonalities and differences among existing model-based clustering algorithms. In this view, clusters are represented as probabilistic models in a model space that is conceptually separate from the data space. For...

33 Index-driven similarity search in metric spaces

Gisli R. Hjaltason, Hanan Samet

December 2003 **ACM Transactions on Database Systems (TODS)**, Volume 28 Issue 4

Full text available:  pdf(650.64 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Similarity search is a very important operation in multimedia databases and other database applications involving complex objects, and involves finding objects in a data set S similar to a query object q , based on some similarity measure. In this article, we focus on methods for similarity search that make the general assumption that similarity is represented with a distance metric d . Existing methods for handling similarity search in this setting typically fall into one of...

Keywords: Hierarchical metric data structures, distance-based indexing, nearest neighbor queries, range queries, ranking, similarity searching

34 Poster papers: Tumor cell identification using features rules

Bin Fang, Wynne Hsu, Mong Li Lee

July 2002 **Proceedings of the eighth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  pdf(152.89 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Advances in imaging techniques have led to large repositories of images. There is an increasing demand for automated systems that can analyze complex medical images and extract meaningful information for mining patterns. Here, we describe a real-life image mining application to the problem of tumour cell counting. The quantitative analysis of

tumour cells is fundamental to characterizing the activity of tumour cells. Existing approaches are mostly manual, time-consuming and subjective. Efforts t ...

Keywords: dynamic water immersion, features rules, identification, local adaptive thresholding, majority vote, meta classifier, weighted vote

35 [Papers from MC²R open call: Towards integrated PSEs for wireless communications: experiences with the S⁴W and SitePlanner® projects](#)

Roger R. Skidmore, Alex Verstak, Naren Ramakrishnan, Theodore S. Rappaport, Layne T. Watson, Jian He, Srinidhi Varadarajan, Clifford A. Shaffer, Jeremy Chen, Kyung Kyoong Bae, Jing Jiang, William H. Tranter

April 2004 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 8 Issue 2

Full text available:  [pdf\(620.32 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

This paper describes the computational methodologies of two problem solving environments (PSEs) for wireless network design and analysis, one academic (S⁴W) and one commercial (SitePlanner®). The PSEs address differently common computational issues such as environment specification, propagation modeling, channel performance prediction, system design optimization, and data management. The intended uses, interfaces, and capabilities of the two PSEs are compared and contrasted in a c ...

36 [Research sessions: data mining: Clustering by pattern similarity in large data sets](#)

Haixun Wang, Wei Wang, Jiong Yang, Philip S. Yu

June 2002 **Proceedings of the 2002 ACM SIGMOD international conference on Management of data**

Full text available:  [pdf\(1.09 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Clustering is the process of grouping a set of objects into classes of *similar* objects. Although definitions of similarity vary from one clustering model to another, in most of these models the concept of similarity is based on distances, e.g., Euclidean distance or cosine distance. In other words, similar objects are required to have close values on at least a set of dimensions. In this paper, we explore a more general type of similarity. Under the pCluster model we proposed, two objects ...

37 [Subspace clustering for high dimensional data: a review](#)

Lance Parsons, Ehtesham Haque, Huan Liu

June 2004 **ACM SIGKDD Explorations Newsletter**, Volume 6 Issue 1

Full text available:  [pdf\(539.13 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Subspace clustering is an extension of traditional clustering that seeks to find clusters in different subspaces within a dataset. Often in high dimensional data, many dimensions are irrelevant and can mask existing clusters in noisy data. Feature selection removes irrelevant and redundant dimensions by analyzing the entire dataset. Subspace clustering algorithms localize the search for relevant dimensions allowing them to find clusters that exist in multiple, possibly overlapping subspaces. The ...

Keywords: clustering survey, high dimensional data, projected clustering, subspace clustering

38 [Bioinformatics—an introduction for computer scientists](#)

Jacques Cohen

June 2004 **ACM Computing Surveys (CSUR)**, Volume 36 Issue 2

Full text available:  pdf(261.56 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The article aims to introduce computer scientists to the new field of bioinformatics. This area has arisen from the needs of biologists to utilize and help interpret the vast amounts of data that are constantly being gathered in genomic research---and its more recent counterparts, proteomics and functional genomics. The ultimate goal of bioinformatics is to develop *in silico* models that will complement *in vitro* and *in vivo* biological experiments. The article provides a bird's eye view of the ...

Keywords: DNA, Molecular cell biology, RNA and protein structure, alignments, cell simulation and modeling, computer, dynamic programming, hidden-Markov-models, microarray, parsing biological sequences, phylogenetic trees

39 [Mining scientific data](#)

Usama Fayyad, David Haussler, Paul Stolorz

November 1996 **Communications of the ACM**, Volume 39 Issue 11

Full text available:  pdf(437.05 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

40 [Articles on microarray data mining: Machine learning in low-level microarray analysis](#)

Benjamin I. P. Rubinstein, Jon McAuliffe, Simon Cawley, Marimuthu Palaniswami, Kotagiri Ramamohanarao, Terence P. Speed

December 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 2

Full text available:  pdf(382.35 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

Machine learning and data mining have found a multitude of successful applications in microarray analysis, with gene clustering and classification of tissue samples being widely cited examples. Low-level microarray analysis -- often associated with the pre-processing stage within the microarray life-cycle -- has increasingly become an area of active research, traditionally involving techniques from classical statistics. This paper explores opportunities for the application of machine learning an ...

Keywords: gene expression estimation, genotyping, incremental learning, learning from heterogeneous data, low-level microarray analysis, re-sequencing, semi-supervised learning, transcript discovery, transductive learning

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41 Experiments in social data mining: The TopicShop system

Brian Amento, Loren Terveen, Will Hill, Deborah Hix, Robert Schulman

 March 2003 **ACM Transactions on Computer-Human Interaction (TOCHI)**, Volume 10 Issue 1

 Full text available: [pdf\(377.92 KB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Social data mining systems enable people to share opinions and benefit from each other's experience. They do this by mining and redistributing information from computational records of social activity such as Usenet messages, system usage history, citations, or hyperlinks. Some general questions for evaluating such systems are: (1) is the extracted information valuable? and (2) do interfaces based on the information improve user task performance? We report here on *TopicShop*, a syst ...

Keywords: Cocitation analysis, collaborative filtering, computer-supported cooperative work, information visualization, social filtering, social network analysis

42 Data mining: Efficient detection of motion patterns in spatio-temporal data sets

Joachim Gudmundsson, Marc van Kreveld, Bettina Speckmann

 November 2004 **Proceedings of the 12th annual ACM international workshop on Geographic information systems**

 Full text available: [pdf\(212.07 KB\)](#)

 Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Moving point object data can be analyzed through the discovery of patterns. We consider the computational efficiency of detecting four such spatio-temporal patterns, namely flock, leadership, convergence, and encounter, as defined by Laube et al., 2004. These patterns are large enough subgroups of the moving point objects that exhibit similar movement in the sense of direction, heading for the same location, and/or proximity. By the use of techniques from computational geometry, including app ...

Keywords: approximation algorithms, geometric algorithms, moving objects, spatio-temporal patterns

43 Multidimensional access methods

Volker Gaede, Oliver Günther

 June 1998 **ACM Computing Surveys (CSUR)**, Volume 30 Issue 2

Full text available:  pdf(1.05 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Search operations in databases require special support at the physical level. This is true for conventional databases as well as spatial databases, where typical search operations include the point query (find all objects that contain a given search point) and the region query (find all objects that overlap a given search region). More than ten years of spatial database research have resulted in a great variety of multidimensional access methods to support ...

Keywords: data structures, multidimensional access methods

44 From informatics to bioinformatics

Vladimir B. Bajic, Vladimir Brusic, Jinyan Li, See-Kiong Ng, Limsoon Wong

January 2003 **Proceedings of the First Asia-Pacific bioinformatics conference on Bioinformatics 2003 - Volume 19**

Full text available:  pdf(538.23 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Informatics has helped in launching molecular biology into the genomic era. It appears certain that informatics will continue to be a major factor in the success of molecular biology in the post-genome era. In this paper, we describe advances made in data integration and data mining technologies that are relevant to molecular biology and biomedical sciences. In particular, we discuss some past and present research results on topics such as (a) the taming of autonomous heterogeneous distributed d ...

Keywords: Dragon, FIMM, Kleisli, PCL, PIES, bioinformatics, data integration, data warehousing, epitope prediction, gene expression analysis, protein interaction extraction, transcription start site recognition

45 Research track posters: Why collective inference improves relational classification

David Jensen, Jennifer Neville, Brian Gallagher

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  pdf(496.13 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Procedures for *collective inference* make simultaneous statistical judgments about the same variables for a set of related data instances. For example, collective inference could be used to simultaneously classify a set of hyperlinked documents or infer the legitimacy of a set of related financial transactions. Several recent studies indicate that collective inference can significantly reduce classification error when compared with traditional inference techniques. We investigate the under ...

Keywords: collective inference, probabilistic relational models, relational learning

46 Research track papers: Cyclic pattern kernels for predictive graph mining

Tamás Horváth, Thomas Gärtner, Stefan Wrobel

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  pdf(291.65 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

With applications in biology, the world-wide web, and several other areas, mining of graph-structured objects has received significant interest recently. One of the major research directions in this field is concerned with predictive data mining in graph databases where each instance is represented by a graph. Some of the proposed approaches for this task rely on the excellent classification performance of support vector machines. To control the

computational cost of these approaches, the underl ...

Keywords: computational chemistry, graph mining, kernel methods

47 Detecting graph-based spatial outliers: algorithms and applications (a summary of results)

Shashi Shekhar, Chang-Tien Lu, Pusheng Zhang

August 2001 **Proceedings of the seventh ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  pdf(590.38 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Identification of outliers can lead to the discovery of unexpected, interesting, and useful knowledge. Existing methods are designed for detecting spatial outliers in multidimensional geometric data sets, where a distance metric is available. In this paper, we focus on detecting spatial outliers in graph structured data sets. We define statistical tests, analyze the statistical foundation underlying our approach, design several fast algorithms to detect spatial outliers, and provide a cost model ...

Keywords: Outlier Detection, Spatial Data Mining, Spatial Graphs

48 Essential classification rule sets

Elena Baralis, Silvia Chiusano

January 2004 **ACM Transactions on Database Systems (TODS)**, Volume 29 Issue 4

Full text available:  pdf(479.09 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Given a class model built from a dataset including labeled data, classification assigns a new data object to the appropriate class. In associative classification the class model (i.e., the classifier) is a set of association rules. Associative classification is a promising technique for the generation of highly accurate classifiers. In this article, we present a compact form which encodes without information loss the classification knowledge available in a classification rule set. This form incl ...

Keywords: Association rules, associative classification, concise representations

49 PocketLens: Toward a personal recommender system

Bradley N. Miller, Joseph A. Konstan, John Riedl

July 2004 **ACM Transactions on Information Systems (TOIS)**, Volume 22 Issue 3

Full text available:  pdf(1.10 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Recommender systems using collaborative filtering are a popular technique for reducing information overload and finding products to purchase. One limitation of current recommenders is that they are not portable. They can only run on large computers connected to the Internet. A second limitation is that they require the user to trust the owner of the recommender with personal preference data. Personal recommenders hold the promise of delivering high quality recommendations on palmtop computers, e ...

Keywords: Collaborative Filtering, Peer-to-Peer Networking, Privacy, Recommender Systems

50 Learning evaluation functions to improve optimization by local search

Justin Boyan, Andrew W. Moore

September 2001 **The Journal of Machine Learning Research**, Volume 1

Full text available: [!\[\]\(3cf084882489248c66b41ee5d191c91e_img.jpg\) pdf\(643.21 KB\)](#) Additional Information: [full citation](#), [abstract](#)

This paper describes algorithms that learn to improve search performance on large-scale optimization tasks. The main algorithm, STAGE, works by learning an evaluation function that predicts the outcome of a local search algorithm, such as hillclimbing or Walksat, from features of states visited during search. The learned evaluation function is then used to bias future search trajectories toward better optima on the same problem. Another algorithm, X-STAGE, transfers previously learned evaluation ...

51 Data Mining with optimized two-dimensional association rules 

Takeshi Fukuda, Yasuhiro Morimoto, Shimichi Morishita, Takeshi Tokuyama

June 2001 **ACM Transactions on Database Systems (TODS)**, Volume 26 Issue 2

Full text available: [!\[\]\(2b0f02b4a70afa75816b328a8d32ffe7_img.jpg\) pdf\(947.41 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We discuss data mining based on association rules for two numeric attributes and one Boolean attribute. For example, in a database of bank customers, Age and Balance are two numeric attributes, and CardLoan is a Boolean attribute. Taking the pair (Age, Balance) as a point in two-dimensional space, we consider an association rule of the form Age,Balance $\Leftarrow \Rightarrow$

Keywords: association rules, convex hull searching, data mining, image segmentation, matrix searching

52 Position papers on MRDM: Prospects and challenges for multi-relational data mining 

Pedro Domingos

July 2003 **ACM SIGKDD Explorations Newsletter**, Volume 5 Issue 1

Full text available: [!\[\]\(ab585dcc444ae74af86fb025f2220621_img.jpg\) pdf\(397.89 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

This short paper argues that multi-relational data mining has a key role to play in the growth of KDD, and briefly surveys some of the main drivers, research problems, and opportunities in this emerging field.

53 Research track papers: Mining, indexing, and querying historical spatiotemporal data 

Nikos Mamoulis, Huiying Cao, George Kollios, Marios Hadjieleftheriou, Yufei Tao, David W. Cheung

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available: [!\[\]\(5fa0e4b749bd76359dceeae0beb7acab_img.jpg\) pdf\(347.95 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In many applications that track and analyze spatiotemporal data, movements obey periodic patterns; the objects follow the same routes (approximately) over regular time intervals. For example, people wake up at the same time and follow more or less the same route to their work everyday. The discovery of hidden periodic patterns in spatiotemporal data, apart from unveiling important information to the data analyst, can facilitate data management substantially. Based on this observation, we propose ...

Keywords: indexing, pattern mining, spatiotemporal data, trajectories

54 Special issue on learning from imbalanced datasets: Mining with rarity: a unifying framework 

Gary M. Weiss

June 2004 **ACM SIGKDD Explorations Newsletter**, Volume 6 Issue 1

Full text available: [!\[\]\(f2bfd7bdabb8bef9ce0ba71e3865c7c0_img.jpg\) pdf\(182.31 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Rare objects are often of great interest and great value. Until recently, however, rarity has not received much attention in the context of data mining. Now, as increasingly complex real-world problems are addressed, rarity, and the related problem of imbalanced data, are taking center stage. This article discusses the role that rare classes and rare cases play in data mining. The problems that can result from these two forms of rarity are described in detail, as are methods for addressing these ...

Keywords: class imbalance, cost-sensitive learning, inductive bias, rare cases, rare classes, sampling, small disjuncts

55 [Aggregate operators in probabilistic databases](#)

Robert Ross, V. S. Subrahmanian, John Grant

January 2005 **Journal of the ACM (JACM)**, Volume 52 Issue 1

Full text available:  [pdf\(816.92 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Though extensions to the relational data model have been proposed in order to handle probabilistic information, there has been very little work to date on handling aggregate operators in such databases. In this article, we present a very general notion of an aggregate operator and show how classical aggregation operators (such as COUNT, SUM, etc.) as well as statistical operators (such as percentiles, variance, etc.) are special cases of this general definition. We devise a formal linear program ...

Keywords: Aggregates, probabilistic relational databases

56 [Research track posters: A framework for ontology-driven subspace clustering](#)

Jinze Liu, Wei Wang, Jiong Yang

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(685.02 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Traditional clustering is a descriptive task that seeks to identify homogeneous groups of objects based on the values of their attributes. While domain knowledge is always the best way to justify clustering, few clustering algorithms have ever take domain knowledge into consideration. In this paper, the domain knowledge is represented by hierarchical ontology. We develop a framework by directly incorporating domain knowledge into clustering process, yielding a set of clusters with strong ontology ...

Keywords: ontology, subspace clustering, tendency preserving

57 [Research track: Screening and interpreting multi-item associations based on log-linear modeling](#)

Xintao Wu, Daniel Barbará, Yong Ye

August 2003 **Proceedings of the ninth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available:  [pdf\(215.87 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Association rules have received a lot of attention in the data mining community since their introduction. The classical approach to find rules whose items enjoy high support (appear in a lot of the transactions in the data set) is, however, filled with shortcomings. It has been shown that support can be misleading as an indicator of how interesting the rule is.

Alternative measures, such as lift, have been proposed. More recently, a paper by DuMouchel et al. proposed the use of all-two-factor Io ...

Keywords: association rule, graphical model, log-linear model

58 Ensembles and boosting: Predicting rare classes: can boosting make any weak learner strong?

Mahesh V. Joshi, Ramesh C. Agarwal, Vipin Kumar

July 2002 **Proceedings of the eighth ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available: [pdf\(1.08 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Boosting is a strong ensemble-based learning algorithm with the promise of iteratively improving the classification accuracy using any base learner, as long as it satisfies the condition of yielding weighted accuracy > 0.5 . In this paper, we analyze boosting with respect to this basic condition on the base learner, to see if boosting ensures prediction of rarely occurring events with high recall and precision. First we show that a base learner can satisfy the required condition even for poor ...

59 Research track papers: A probabilistic framework for semi-supervised clustering

Sugato Basu, Mikhail Bilenko, Raymond J. Mooney

August 2004 **Proceedings of the 2004 ACM SIGKDD international conference on Knowledge discovery and data mining**

Full text available: [pdf\(187.51 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Unsupervised clustering can be significantly improved using supervision in the form of pairwise constraints, i.e., pairs of instances labeled as belonging to same or different clusters. In recent years, a number of algorithms have been proposed for enhancing clustering quality by employing such supervision. Such methods use the constraints to either modify the objective function, or to learn the distance measure. We propose a probabilistic model for semi-supervised clustering based on Hidden Mar ...

Keywords: distance metric learning, hidden Markov random fields, semi-supervised clustering

60 Discovering Matrix Attachment Regions (MARs) in genomic databases

Gautam B. Singh

January 2000 **ACM SIGKDD Explorations Newsletter**, Volume 1 Issue 2

Full text available: [pdf\(739.57 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Lately, there has been considerable interest in applying Data Mining techniques to scientific and data analysis problems in bioinformatics. Data mining research is being fueled by novel application areas that are helping the development of newer applied algorithms in the field of bioinformatics, an emerging discipline representing the integration of biological and information sciences. This is a shift in paradigm from the earlier and the continuing data mining efforts in marketing research and s ...

Keywords: DNA Sequence Analysis, MARs, Matrix Attachment Regions, bioinformatics, data mining, gene therapy, medical data mining

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- 15 [6,707,812](#) **T** [System, method and article of manufacture for element management in a hybrid communication system](#)
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19 6,671,818 T Problem isolation through translating and filtering events into a standard object format in a network based supply chain

20 6,640,249 T Presentation services patterns in a netcentric environment

21 6,640,244 T Request batcher in a transaction services patterns environment

22 6,640,238 T Activity component in a presentation services patterns environment

23 6,636,242 T View configurer in a presentation services patterns environment

24 6,625,585 T Method and system for artificial intelligence directed lead discovery though multi-domain agglomerative clustering

25 6,615,253 T Efficient server side data retrieval for execution of client side applications

26 6,611,867 T System, method and article of manufacture for implementing a hybrid network

27 6,606,744 T Providing collaborative installation management in a network-based supply chain environment

28 6,601,234 T Attribute dictionary in a business logic services environment

29 6,601,192 T Assertion component in environment services patterns

30 6,581,048 T 3-brain architecture for an intelligent decision and control system

31 6,578,068 T Load balancer in environment services patterns

32 6,571,282 T Block-based communication in a communication services patterns environment

33 6,564,209 T Knowledge management tool for providing abstracts of information

34 6,556,659 T Service level management in a hybrid network architecture

35 6,549,949 T Fixed format stream in a communication services patterns environment

36 6,542,593 T Rules database server in a hybrid communication system architecture

37 6,529,909 T Method for translating an object attribute converter in an information services patterns environment

38 6,516,288 T Method and system to construct action coordination profiles

39 6,493,637 T Coincidence detection method, products and apparatus

40 6,484,123 T Method and system to identify which predictors are important for making a forecast with a collaborative filter

41 6,449,588 T Customer-driven QOS in hybrid communication system

42 6,442,547 T System, method and article of manufacture for information service management in a hybrid communication system

43 6,427,132 T System, method and article of manufacture for demonstrating E-commerce capabilities via a simulation on a network

44 6,426,948 T Video conferencing fault management in a hybrid network

45 6,421,613 T Data processing of the maize *prolifera* genetic sequence

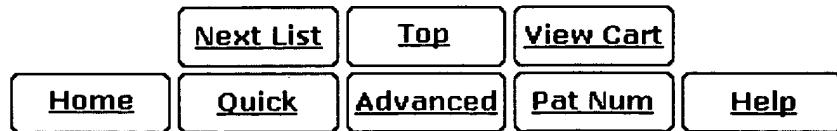
46 6,345,239 T Remote demonstration of business capabilities in an e-commerce environment

47 6,301,579 T Method, system, and computer program product for visualizing a data structure

48 6,286,005 T Method and apparatus for analyzing data and advertising optimization

49 6,233,566 T System, method and computer program product for online financial products trading

50 6,195,697 T System, method and article of manufacture for providing a customer interface in a hybrid network



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52 [6,147,975](#) [T](#) [System, method and article of manufacture of a proactive threshold manager in a hybrid communication system architecture](#)

53 [6,081,518](#) [T](#) [System, method and article of manufacture for cross-location registration in a communication system architecture](#)

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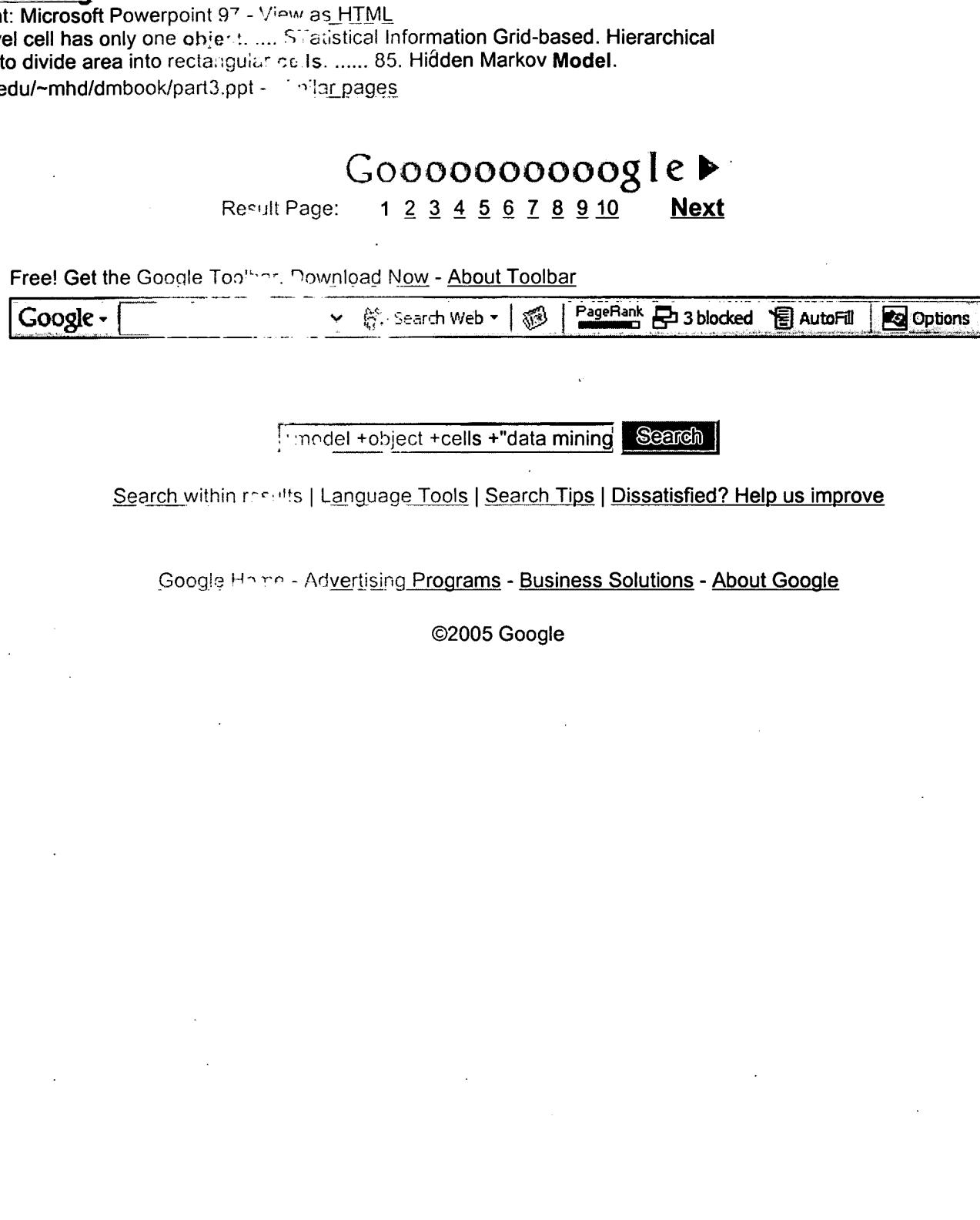
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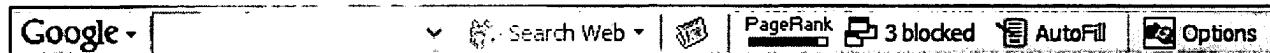
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